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The Report of the Eleventh Census on Manufactures.

Primarily the object of a Federal census was to obtain a count of the people for the purpose of determining the congressional representation. The census reports of to-day are supposed to contain, not only the number of the inhabitants with numerous details concerning nativity, age, sex, and physical and social condition, but a complete statistical presentation of the resources of the country, statistics of the transportation business, wealth, insurance, and reports on numerous subjects considered by Congress or the Executive as worthy of special investigation.

While the practice of encumbering the census with a number of independent inquiries has resulted in securing and codifying a vast amount of valuable information, it is not systematic, and has in a measure diverted the energy of the office from the primary objects of the investigation, viz., the presentation of uniform and reliable statistics that can be used in making those contrasts and comparisons that are most instructive and useful for deducing sound rules for the administration of government and for the promotion of the welfare of society.

The consensus of opinion appears to be that the census of 1900 should be limited to the three topics, population, agriculture, and manufactures, and the information concerning each confined as far as possible to general totals.

The Report on Manufacturing Industries in the United States at the eleventh census is composed of three parts or volumes. Part I presents totals for the United States, states and territories, counties and indus-

tries; Part II, statistics for the 165 cities that had a population of 20,000 and over; and Part III, detail statistics and text for a number of important industries. There are more than 2,000 royal octavo pages of solid statistical tables in these volumes, but they do not contain much more than half of the detail that would have been presented had the original scheme been followed.

In collecting the statistics of manufactures there were 27 special schedules provided for as many important industries, and one general schedule to be used in reporting all industries for which special schedules were not furnished. The questions in all of the schedules were uniform in so far as they called for the amount of capital invested, number of employees and yearly wages, cost of materials, miscellaneous expenses, and value of yearly product. But the special schedules had numerous questions designed to develop detail statistics concerning the industries to be reported on them. Many of them were subdivided; for instance, the schedule on which the iron and steel industry was reported had separate sub-schedules for each of the following branches of the industry: blast furnaces, rolling mills, Bessemer, open-hearth, Clapp-Griffiths and Robert-Bessemer steel works; crucible, blister, German, and miscellaneous steel works, and bloomeries and forges, making six schedules for the industry. In the same manner the electrical industries were reported on about 30 separate schedules, each one having questions peculiar to a particular branch of the industry.

The schedules were prepared with the intention of gathering data that would permit an exhaustive statistical presentation of the manufacturing and mechanical industries of the country. If the scheme had been followed to its logical conclusion, the results would have

formed an ideal census, but they would not have been published before the time to begin work on the twelfth census, and their magnitude would have detracted from their value. But the theoretical results indicated by the form of the schedule could not be reached, for the obvious reason that it is impossible to obtain a report on such a schedule, perfect in every detail, from each and every establishment engaged in the manufacturing and mechanical industries in the United States; it is impracticable to secure such a report for even the larger establishments, say those with an annual product of \$10,000. The manufacturers are not inclined to furnish such details concerning their business, and the majority of them do not keep book accounts from which the information could be obtained.

The schedules were probably theoretically perfect, or very nearly so, but the detail considered essential to such perfection rendered them in many respects undesirable for a canvass to be conducted by inexperienced enumerators. The schedules for such a canvass should be designed, not with the idea of developing detail, but with the view of curtailing the number of inquiries as far as possible, consistent with a full report of the total values that it is desired to present. The schedules of the eleventh census probably secured a fuller report than did those of any prior census for each of the four totals of capital, employees and wages, materials, and products, because it required the items forming each to be reported separately.

It is evident that the schedules of 1880 were not sufficient in detail while those for 1890 erred to some extent in the opposite direction. The schedules for the twelfth census should be prepared with a full knowledge of the

results obtained by the use of the schedules at the two preceding censuses, as well as the difficulties of the canvass in which schedules with numerous questions are used.

Having in view the fact that the establishments engaged in the productive industries are largely concentrated in cities, General Walker, superintendent of the tenth census, caused the canvass in 100 of the principal cities to be made by agents appointed especially for that purpose.¹ At the eleventh census 1,049 cities were treated in this manner. The agents appointed to collect the statistics of manufactures were paid by the day, not by the schedule as were the enumerators. The results at both censuses show that a more thorough canvass was made of the cities than of the rural districts, and as there were a greater number of cities canvassed in this manner in 1890 than in 1880 the grand totals of the later census indicate that a more thorough canvass had apparently been made of the entire country.

Of the 1,049 cities canvassed by special agents in 1890 the totals for only 165 were published separately.² The totals for these 165 cities show that they contained 52 per cent of the establishments of the country and 67 per cent of the total product. It therefore is evident that if a careful canvass had been made of 1,050 of the principal centers of industry, reports would have been secured from practically all of the manufacturing establishments of the country. This was the intention of the eleventh census, but, owing principally to the lack of time for preparation, the canvass in many of the cities was not thorough.

In no other branch of the census canvass was the lack

¹ Tenth Census. Manufactures. 379-445.

² Eleventh Census. Manufacturing Industries. Vol. 2.

of experienced employees and of a thorough organization more keenly felt than in the canvass of the cities for the statistics of manufactures. The necessity of a thorough and rapid canvass is just as urgent as it is in the enumeration of the population, but the work in the 1,049 cities was not thorough, and in fact the canvass in the 165 cities for which the results were published separately, was not finished until 1893, three years after all the data for the census were supposed to have been gathered, and it was only accomplished then by sending clerks and agents from the office in Washington to finish the field work.

The canvass of the cities by special agents is the only satisfactory method of collecting the statistics of manufactures. It was inaugurated at the tenth census, and while the system was not then perfected, it was adopted, practically with no changes, at the census of 1890. The only objection to such a canvass is the increased expense. The reports secured by special agents at the eleventh census cost on the average, one dollar apiece, and as a large percentage of them were for very small establishments, such as dressmakers, boot and shoe shops, blacksmith shops, etc., the results were criticised as not justifying the increased cost.¹ But it is only by perfecting this branch of the canvass that the early publication of reliable data can be assured.

The preparation of the schedules; listing the names and localities of the principal establishments, to be used as a check on the reports, appointment of enumerators and special agents, and following the canvass to insure a thorough enumeration, are all preliminary stages in census work. They are, however, the stages on which the whole superstructure is based, and if the plans for

¹ *E. g.*, above, p. 271, f.

this branch of the work are not carefully matured, and the work itself pushed systematically and vigorously the census will be a failure.

The census totals for population, agriculture, and manufactures can only be accepted as the results of a popular canvass, which of necessity is more or less incomplete. The results are not exact, and probably never will be, but they come nearer and nearer to exactness as the methods under which they are reached approach perfection. The Census Office is not a permanent bureau and only two enumerations, those of 1860 and 1880, have been made under the supervision of a person who had supervised a prior census. At each census the foundation has to be laid anew and practically the whole work accomplished by inexperienced persons; nevertheless an examination of the reports will satisfy the most skeptical that there has been a constant improvement in every direction.

It has been the endeavor of the superintendent of each census since 1850 to make a complete enumeration of all establishments engaged in the productive industries. These enumerations have included both large and small establishments, as well as those conducting a mercantile business in connection with manufacturing, and some that possibly should not be classed as manufacturing. The theory seems to have been to include all industries that could in any sense be considered as productive, excepting, of course, agriculture and mining. Carpentering, masonry, and all the building trades have been included, the value of the buildings erected or the work done on them being accepted as the product for the year. Millinery was reported, and the value of the trimmed hats and similar work given as the product,

¹ Cf. above, pp. 269-275.

also dressmaking, mechanical dentistry,¹ and numerous industries carried on almost entirely in very small shops, provided the annual product amounted to five hundred dollars. The statistics, therefore, do not pertain exclusively to industries conducted in factories and now commonly accepted as the manufacturing industries of a country, nor can the results be accepted as showing the exact increase or decrease in many of the industries enumerated; for instance, there were 9,184 carpenter shops reported in 1880 and 16,917 in 1890, or an increase of 7,733, but all the carpenter shops were not enumerated in 1880, and while a greater proportion of them were reported in 1890, it is known that they were not all returned. The totals for a number of other industries, such as "Boots and shoes, custom work and repairing," "Blacksmithing and wheelwrighting," and "Clothing, women's, dress-making," are open to the same criticism. These industries are referred to in the census reports as "hand trades," and the number of establishments reported for them can only be accepted as forming a part of the grand total for all industries, which they increase when the canvass is thorough, whereas they have a tendency in the opposite direction when the canvass is lax. The totals for the separate industries do not show the actual increase or decrease from decade to decade, because no census has succeeded in securing a report from all of the establishments. Therefore the results are frequently referred to as of no practical use and misleading. All of the census totals are open to similar criticism; the totals for population, and for the different occupations as obtained from the population schedule are not true. Numerous omissions have always occurred in the enumeration, but the tendency has been to decrease them,

¹ Mechanical dentistry was reported but in part. Cf. Eleventh Census. Manufacturing Industries, 2 : 1x, x.

and it is only by persistent effort that perfection can be attained. There is no method of determining the extent of the omissions in the report on manufactures, except by a re-canvass, as no comparisons can be made between the statistics of population and manufactures for this purpose.

It is essential that all industries should be included in a census that purports to show the productive forces of the country. Reports should be secured from all establishments, large and small, otherwise the results will not be a true indication of our manufactures. It is useless to assert that the results do not warrant the additional expense and difficulties attending the enumeration of the small establishments, and that the statistics could be estimated. It is impossible to prepare an estimate for an unknown proportion of an unknown quantity, and all attempts at such an estimate will be far more unsatisfactory and misleading than the results of a canvass, even though we know that, because of the magnitude of the work, omissions have occurred. But the factory system has now so thoroughly permeated all lines of industry that it is essential some distinction should be made in gathering and presenting the statistics for the great and truly manufacturing industries. This was attempted in a limited way at both the tenth and eleventh censuses, but the magnitude of the work and the limited time for preparation made it impossible to perfect the scheme, except for a few of the most important industries. The results of this effort at the eleventh census are contained in Part III of the Report on Manufacturing Industries. This volume presents statistical details and explanatory text for 18 of the principal industries of the country. The intention was to present historical and statistical reports similar to

those on the Factory System of the United States,¹ Petroleum and its Products,² The Building Stones,³ etc., published in the tenth census. This was found to be impracticable, however, and the presentation was curtailed so as to present the statistics and text for all of the industries in one volume of 725 royal octavo pages.

The objections to gathering and publishing detailed statistics of this character in connection with a general report on manufactures are twofold. First, it tends to multiply the number of different schedules and inquiries, making them so complicated that the enumerators cannot comprehend them, and the manufacturers hesitate to furnish the details. Second, the statistics for many of the industries have to be confined to a certain class of establishments rather than to the character of products, and the quantity and value of products are confusing and misleading when compared with a general table giving the total for all industries. For instance, \$430,954,348 is shown in the general tables on manufactures as the value of product for iron and steel, while the special report on the same industry shows \$478,687,519 as the value of product. The difference of \$47,733,171 is accounted for by the fact that some of the establishments included in the special report manufacture finished articles that in the general tables were assigned to other branches of industry, such as iron and steel nails, iron pipe, iron doors and shutters, etc. The special report is confined to a presentation of the statistics of blast furnaces, rolling mills and steel works, iron ore forges, and pig and scrap iron bloomeries; but a large number of the establishments, that in 1880 were assigned to some one of these groups, now take the

¹ Tenth Census. Manufactures, 527-610.

² Tenth Census. 10.

³ *Idem*, 10.

crude material and produce finished articles, such as steel rails, boiler plate, nails, etc., so that the products of the different establishments have no more relation to each other than have the products of a nail factory and a foundry and machine shop. The industry has undergone such changes that there is now no cessation in the different stages of production, they are all carried on continuously under the same roof and it is no longer possible to classify the establishments according to the character of the material consumed.

In the special report on chemicals and allied products¹ it is admitted that the statistics do not cover all branches of the industry, but are confined to certain selected products, and the schedules from which the totals were compiled had to be segregated and assigned to numerous branches of industry in compiling the general tables on manufactures. The text states, "Castor oil, glucose, soap, and allied products included in the chemical report of the tenth census, were not so enumerated in the eleventh. Pharmaceutical preparations, ready mixed paints, varnishes, and japans, reported among the general statistics of manufactures in 1880, are included in the totals presented in this report. Baking powder, blacking, cottonseed oil, glue, inks, linseed oil, patent medicines or proprietary goods, vinegar, whiting, and paris white appear in the general statistics of manufactures for both censuses."² In other words, the report does not present statistics for the industries it is supposed to cover.

It is evident that with but few exceptions the special reports contained in Part III are not exhaustive, and that in the present state of industry complete reports of

¹ Eleventh Census. Manufacturing Industries, 3 : 273-308.

² *Idem*, 275.

this character can only be prepared either by a system that follows a given material to a finished product, regardless of the character of that product, or by a system that considers a given kind of product regardless of the character of the materials entering into it or of the establishments producing it. But as such methods are not in harmony with a general census of all industries, the two reports should not be blended. The special reports have their value, but the methods of gathering and compiling the statistics should be peculiar to the industry treated, and should not be abridged so as to conform to general rules made to apply to all industries. The data should be gathered quite independently of the general enumeration, and the statistics published in distinct reports.

The character of the information required for a census report on manufactures, the methods of gathering the data, and all the factors entering into their compilation render them unreliable for the purpose of computing the various elements of cost entering into a given unit of product, or the proportion of total cost that should be charged to capital and labor respectively. It is frequently asserted that the Report on Manufacturing Industries of the eleventh census contains tables purporting to show such facts. The tables¹ referred to show the amount expended for miscellaneous expenses, wages, and materials, respectively, in a product valued at \$100. The general summing up for all industries shows the total cost of \$100 worth of product to have been \$86.17, of which miscellaneous expenses formed \$6.73, wages \$24.36, and materials \$55.08, and it is explained that the remaining \$13.83 cannot be accepted as the profits or earnings for capital, because the cost re-

¹ Eleventh Census. Manufacturing Industries, 48-53.

ported on the census schedule does not include cost for depreciation of plant or mercantile risks.¹ But these tables do not, and from the very nature of the data on which they are based can not, show the proportion credited to labor of the total cost of manufacturing a given quantity of finished product. The census schedule did not solicit data on which computations as to the total labor cost in the finished product can be based; it only contemplated a statement from each manufacturer of the amount he expended during the year for each of the three items of cost enumerated above. For instance, a pig-iron manufacturer reports that he expended \$500 for miscellaneous expenses, \$3,500 for wages, and \$4,000 for materials. If similar statements are obtained for all the blast furnaces, rolling mills, steel works, and other iron and steel manufacturers in the country, the totals will show the expenses under each of the three items in the iron and steel industry of the country, and the proportion that each bears to the gross value of product is presented in the tables referred to. Such totals do not show the proportion of the total value of finished product that should be credited to labor. They only show that for each \$100 received by the manufacturers a certain amount was paid for each of the items of expense enumerated.

The value of the finished product of the blast furnace is due to the manufacturing forces expended on it, of which labor is the principal element, but it enters the steel works, so far as the census reports are concerned, as pure raw material and its cost is reported by the steel manufacturer as the cost of his materials. In his report he has nothing whatever to do with the elements that go to make the value of those materials. But it is

¹ *Idem*, 48, foot-note. Cf. above, p. 280.

evident that in order to ascertain the labor cost in any finished article the amount expended for labor in each and every stage of production must be considered, and the duplications incident to the products of one factory entering as materials in another eliminated. Of these duplications and re-duplications the census reports take no cognizance, the materials entering each manufacturing establishment are considered as being in their pure raw condition and no attempt whatever is made to analyze their value. In other words, each establishment is supposed to commence and end business with the beginning and ending of the census year ; no account is taken of their operations before or after that date and no attempt is made to analyze the values reported. Therefore the census totals can only be accepted as showing, and in fact they only purport to show, the amounts expended by all manufacturers for miscellaneous expenses, wages and material, and the amount they receive for their product.

The duplications entering into the finished product and the proportions that the constituent elements of that product bear to each other and to the total true value, can only be ascertained by a careful detail investigation. While such facts may in the future be disclosed by census investigation, it has not thus far been the design of the census inquiries to develop them. The census totals as presented in all of the reports, and the official computations based on them can only be accepted as disclosing the simple facts of expenses and receipts. It was supposed that each manufacturer could give reasonably accurate data as to the amount he expended during the year for miscellaneous expenses, wages, and materials, and the amount of his receipts ; this was all the office deemed it wise to call for, and in fact it was very difficult

in many cases to obtain even such simple data. But having such figures, it is obvious that but one calculation could be based on them, and that would be to determine the amount of each item of expense represented in a given value received. This calculation has no connection whatever with the proportion that labor cost is of the total cost of a finished product; such a calculation must have an entirely different basis; it is intricate, and of necessity an extended computation. It was attempted in the report of the United States Department of Labor on the Cost of Production, and was found to be possible only in a few industries where the different stages of production were well marked. Notwithstanding these radical differences, the census totals are constantly quoted as showing that the laborer receives only 24 per cent of the value of the product of his industry. Nothing is more absurd, and the figures are not capable of such construction except by the most woeful distortion.

The total value of the products of manufacturers for 1890 is reported as \$9,372,437,283. This total has been criticised as misleading, in that it contains so many duplications. It is true that if the processes of production are followed step by step and the cost of the original raw material increased only by the value due to the manufacturing forces expended at each stage, an entirely different total will be obtained, but that total will not be the value received by the manufacturers for their yearly products. The manufacturers are not in a position to report any other value for their products than their receipts during the year, and under the theory in conformity to which censuses have heretofore been taken, it would be impossible for the census office to publish any other total as the value of the products

of industry. The total can be reduced by subtracting the cost of materials, which amounts to \$5,162,044,076, and while the difference, \$4,210,393,207, may come nearer to the value added to the raw material by the manufacturing processes through which it has passed, it is not the true enhanced value of those materials, and certainly is not the value which is received by the manufacturers and out of which the business expenses and profits of the year are paid.

The duplications incident to manufacturing when carried on by different establishments is referred to in the text of the census reports and \$4,210,393,207 given as the net value, or gross value of products less the total cost of materials used, but no claim is made that the amount represents the exact value added to the raw materials by the manufacturing processes; it is rather referred to as indicating the method to be followed in ascertaining such a value. The census inquiry as to "product" was designed to obtain only the full value of the year's production. No attempt was made to ascertain what became of the products, whether they were purchased by the final consumer, entered another factory as materials, or were destroyed by the purchaser. The product of one establishment may have been cloth and of another ready made clothing. The latter may have purchased the wool and raw cotton and manufactured the cloth out of which he made his finished product, clothing, or he may have purchased the cloth from the former, but with the character of the materials or product the census had no concern. The amount expended for materials, no matter of what they consisted, and the amounts received for the year's products were the only amounts to be reported. The sum of the amounts received by the cloth manufacturer for his

cloth and of the amounts received by the clothing manufacturer for his clothing, represents the value of the products of the two establishments.

It is possible that in the future some other scheme may be devised for collecting and compiling the census statistics of manufactures, but until its practicability has been fully demonstrated, it seems to me that the results of the year's business as shown by the books of each manufacturing establishment should be reported, and the total of all published as the result of the various operations. After eliminating, as far as possible, the incomparable features of the censuses of 1880 and 1890 the increase in the value of product is computed at 69.31 per cent. This is an increase in gross values, and is no indication of the increase in the actual productive forces of the country, which is determined only by the increase in the quantity of product. A given value now represents a much larger quantity than formerly, and therefore the percentage of increase in quantity would be much larger than it is in the values. This excess of increase in quantity is indicated in the census reports for a few industries, of which the factory product of boots and shoes is one. There were 125,478,511 pairs of boots and shoes of all kinds reported for 1880 and 179,409,388 pairs in 1890, an increase of 42.98 per cent as compared with an increase of 32.88 per cent in the value of products. But it is impossible to ascertain the quantity of products for all industries, not only because of the great diversity in their character, ranging from the rough log in the forest or the bar of pig iron in the blast furnace to illuminating gas and electricity, but because, with the exception of a few industries, it is impossible to keep a record of quantities, and the information is not in existence. The office therefore has been

forced to accept values as the standard of measurement, and while they are a reliable indication of business prosperity or depression, they do not show the increase or decrease in manufactures with the exactness that it is desirable.

Accepting value as a reliable unit of measurement, the use of the gross value of all products for this purpose is not beyond criticism. The true value that should be used is the value of the materials in the shape that they first enter a factory plus the cost of all the productive forces expended on them in the different stages of perfection through which they pass in reaching the finished product, but this value is one that but few manufacturers are in a position to furnish. The gross value when compared with a similar value may be accepted as indicating the conditions prevailing at the two periods compared. But unfortunately there are other factors that tend to confusion in the use of these values; for instance, there is an increase of 86 per cent shown for slaughtering and meat-packing, indicating that the value of these products had increased in that ratio, while as a matter of fact a large proportion of the increase is accounted for by the concentration of the industry. The retail butchers, who were not reported at either census, have given place to the large establishments, or are obtaining their products from such establishments and appear in the roll of merchants only, and as similar conditions exist in other industries, the total value of products can be accepted as an indication of the increase, only in certain lines of industry.

The inquiries concerning employees and wages used at the eleventh census were far more complete than those of any previous census, and yet the results have been the subject of more adverse criticism than possibly

any other feature of the census reports. It is impossible to secure a complete report of employees and wages unless the general classes are designated. This was realized when the schedules for the census were prepared, and the classification adopted was: 1st, officers and firm members; 2nd, clerks; 3d, operatives, skilled and unskilled; and, 4th, pieceworkers. The published reports show not only the average yearly, but the average weekly earnings for the classes of employees designated and the average number employed during the year at stated weekly rates of pay. The objections to the inquiries are threefold:

First The sum of the employees and wages given in answer to the four sub-questions of the inquiry are not proper totals to be placed in comparison with the totals for prior censuses. The questions used at prior censuses designated no class of employees, and it is evident that officers, firm members, and clerks, and their salaries, were not fully reported, and therefore they should be omitted when computing the average wages that are to be compared with a similar average for 1880. The average as then computed is \$445 as compared with \$347 for 1880. It is probable that the average for 1890 is about correct, and the large increase over 1880 is accounted for as follows: The form of the question for 1880 tended to obtain a number in excess of the average, which of course would reduce the average wages, but in addition to this, an examination of the original reports and tabulations of that census discloses the fact that the reports were not edited in the careful and thorough manner that they were in 1890; that is, some reports in which employees were given and no wages, or a trivial amount of wages, or, apparently, an abnormal number of employees as compared with the wages, were allowed

to stand and enter the tabulation in their defective condition. While the number of such cases was not ascertained, and could not be ascertained without a re-examination and tabulation of the reports, the practice tended to increase the number of employees and to decrease the average wages obtained when using the total as a divisor. The form of the question and also the defective condition of the reports resulted in obtaining a lower general average wage than the actual conditions warranted. Therefore the defect, so far as the comparison is concerned, is to be found in the reports for 1880 rather than in those for 1890. But the defect was evidently not very serious, for the census of the State of Massachusetts shows an increase in the average annual earnings during the decade from 1885 to 1895 of \$95, while the census reports show an increase of \$98 for the decade from 1880 to 1890.

Second. The inquiry calls only for the average number of persons employed during the year. While the average has been generally accepted as the divisor for the total wages in ascertaining the average earnings per employee, it is not the true number that should be used for that purpose. The average is a number that, for large establishments especially, can be ascertained only by calculations which the enumerators and special agents, as a rule, are not competent to make, or do not care to take the trouble to make. The result is that the true average number is rarely reported, and the divisor is either greater or smaller than it should be in order to ascertain the average earnings.

Third. That portion of the inquiry calling for the number of persons employed at fixed rates of wages per week did not require the different classes to be reported

separately, and the result is that firm members, officers, clerks, laborers, and skilled and unskilled operatives are included in one general total. The results therefore do not show the number of wage earners employed at stated rates, but the total number of all classes, and are apt to be misleading.

Notwithstanding these objections, the inquiries concerning employees and wages were a great advance over those of prior censuses. The inquiries under this head prior to 1890 were so general that no check could be made on the answers in editing the schedules, and the results are certainly not of the character that should be compared with those of the eleventh census for the purpose of computing the exact increase.

I believe the reports of the eleventh census contain about as complete a presentation of employees and wages as it is possible to secure by means of a general canvass. The statistics form a reliable basis for comparison with the results of future censuses, provided the same form of inquiry is used. The only change that I can now suggest would be to separate the officers, firm members, and clerks from the other employees in reporting the number at stated weekly rates of pay.

The census inquiries concerning capital were formulated with the intention of securing the value of all the property or assets used in the business strictly pertaining to manufacturing, whether such property was owned, borrowed, or hired. The several items were specified as land, buildings, machinery, tools and implements, raw materials on hand, stock in process and finished products on hand, cash on hand, bills receivable, unsettled ledger accounts, and sundries not included in any of the foregoing items. The amounts expended for rent and for interest were also required. The results obtained

in answer to these questions were certainly far in advance of the showing for capital in prior census reports, but all reports as to capital are, from the very nature of the items to be returned, open to criticism. The reports of the eleventh census are the results of an honest, and apparently an exhaustive effort to secure a full return, and the criticisms of them have been almost exclusively on the theory that it is impossible to obtain an accurate report of capital in answer to any series of questions that may be formulated.

The amount of capital, including the value of hired property, is reported as \$7,681,381,543. A large proportion of this total is of necessity an estimate, or rather the accumulation of hundreds of estimates made by as many different proprietors, and it can not be seriously contended that each has made a careful estimate and included all amounts that should be reported. The great diversity of items, and the constant shifting of some of them renders it impossible to secure an accurate return even of those items that appear on book accounts.

Given a series of questions concerning capital that are theoretically complete, a competent agent assisted by the most willing, experienced, and well informed proprietor will find great difficulty in securing a satisfactory report. But this happy combination of an obliging, well informed proprietor and experienced agent is something that is practically unheard of in a census canvass. The result is that the answers to this, the most difficult of all census inquiries, have been unsatisfactory. Complete answers to the questions necessitate a careful estimate of the values to be placed on the real estate and improvements. If this is owned by the proprietor he is probably in a position to make the estimate, but if it is not owned by him, the agent is forced to hunt up the

owner, or estimate the values, using the amount paid as rent, taxes, or some other equally unreliable factor as a basis.

The value of the items of live capital, such as raw materials on hand, stock in process and finished products on hand are also almost entirely matters for estimate. The instructions to the special agents stated that "the amounts given in answer to these questions should be estimated at the present selling value of such products." These items, as well as the amount of cash on hand, bills receivable, unsettled ledger accounts and sundries, evidently contemplate that a particular day during the year should be considered, and the values for that day only reported. This is unavoidably so, because the amounts and values of each of the items shift and change from day to day, but notwithstanding the necessity for fixing such a date, the schedules and instructions are silent on the subject. In the majority of establishments operating under ordinary business pressure it is probable that the amount of raw material on hand, stock in process and finished products will not vary greatly during the year, but it is not at all improbable that an establishment may be operated under such conditions that there would be a great variance in the values reported for these items at different times. It is certain that in the majority of establishments the amount of cash on hand, bills receivable, and unsettled ledger accounts depend entirely on the exact date for which the report is made. All the questions in the census schedule cover the business of the establishments for one year, but the question concerning capital should be limited to some particular date, otherwise the amount of live capital reported will depend entirely upon the whim or agreement of the agent and proprietor.

It has been suggested that in estimating the amount of "credit capital" the interest paid during the year could be used as a basis, and this plan was originally contemplated by the Census Office, but, after mature consideration, abandoned as impracticable. Credit capital was understood to mean, not the credit of the establishment, but the extent to which that credit had been utilized. It is manifestly as impossible to estimate the total credit of an establishment as it is to estimate the extent to which that credit has actually been employed in the business during the year. For instance, some materials may be purchased on time and no interest paid, while the bills of other materials carry interest. Both are items of credit capital, but the amount of interest paid is no criterion from which the sum of both credits can be estimated.

The contingencies and intricacies surrounding any inquiry concerning capital satisfied General Walker that it was impossible to secure reasonably accurate data on the subject by means of a popular canvass, and he advocated the abandonment of the inquiry, stating "that it ought never to be embraced in the schedules of the census." While it cannot be contended that the statistics of capital for the eleventh census completely meet the criticism of General Walker, his objections to the inquiry as it appeared in prior census schedules, and all other criticisms were carefully followed in formulating the inquiries, and I believe the defective results are due, not so much to the form of the inquiry as to the inexperience and lack of knowledge on the part of the enumerators and the unwillingness of the manufacturers to furnish information on the subject. I do not agree with those who advocate the abandonment of the inquiry and would prefer to estimate the capital, using the relation-

ship between product and capital, and the general knowledge of conditions prevailing in industry as the basis. Estimates of that character can be made, and they may come very near the truth, but how near there is no way to determine; they will be rightly subject to more just criticism than the results of an honest effort to obtain the actual facts from each proprietor. If the amount of capital is estimated, the value of the products, not only of manufactures but of agriculture, can be treated in the same manner, and the field for results open to all kinds of criticism extended indefinitely.

To the ordinary business man the term "capital" indicates an amount that is capable of being determined with a reasonable degree of accuracy. It is only in the exceptionally large establishments where the intricacies arise, but from a practical business standpoint, no proprietor would be willing to acknowledge that he did not know how much capital he had invested in his business, and this is especially true of large establishments. I believe that all manufacturers who have any system about their business have a definite idea of the amount of their capital, and if they are inclined to furnish the information it can be secured with as great a degree of accuracy as can the value of products, or any other facts connected with the census.

It is contended that in many classes of industry it requires about one dollar of capital to produce a dollar's worth of product. The census reports show that for all industries throughout the entire country it required 82 cents' worth of capital to produce one dollar of product. Estimates could be prepared to make these results conform more closely to a statistician's idea of the general conditions of business, but to the ordinary reader the estimates made on a theoretical basis and to conform

exactly to a preconceived idea, would not be accepted with the degree of satisfaction that a compilation of reports coming from individual manufacturers as to their own business would be. From an exact statistical standpoint all the census totals are untrustworthy, and it is possible that the degree of error is a shade greater in the reports of capital, but I do not believe that the cost of gathering the data for capital bears a greater ratio to its usefulness than does most of the census statistics. The expediency of retaining or omitting the inquiries because of the opposition to furnishing the information appears to be the feature that should receive the most earnest consideration at the next census. To the ordinary reader the industrial statistics will be very incomplete without some presentation concerning capital.

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